

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN COIN DISPENSERS

(71) We, COIN CONTROLS LIMITED, a British company of King Mill Shaw Road, Royton, Lancashire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to coin dispensers arranged to deliver coins or circular tokens one at a time from a quantity of those articles contained in a hopper.

The invention provides an improved coin dispenser less liable to jamming than are some known dispensers.

According to the present invention there is provided a coin dispenser comprising a coin container of circular section having extending thereacross at its lower end a circular coin transport member mounted for rotation concentrically with said container and of which the uppermost portion is pierced by circular apertures of a size to accept coins to be dispensed, another portion of said member beneath said uppermost portion forming individual radial arms extending between each adjacent pair of said apertures, said arms having a radial length such that their outer ends do not extend beyond a circle upon which lie the centres of said apertures, whereby coins passing through said apertures to be supported by a substrate are entrained by said arms, and an ejector member pivotally mounted with respect to said container and positioned to engage coins entrained by said arms thereby to cause said coins to pass through an aperture formed in the side of the container, said ejector member being movable against a resilient bias to a position permitting the passage past the ejector member position of any coin trapped in an aperture of said transport member.

Preferred features and advantages of the present invention will become apparent from the following description of an embodiment thereof, taken in conjunction with the accompanying drawings of which:—

Figure 1 is a side elevation of a coin dispenser which in operation will be mounted with a mounting bracket B secured to a hori-

zontal support surface S, so that the axis of rotation of a hopper portion to be described will be inclined to the vertical at an angle of approximately 45°;

Figure 2 is an exploded view of the coin dispenser mechanism;

Figure 3 is a plan view of the dispenser mechanism with the hopper removed;

Figure 4 is a sectional side elevation of a component of the dispenser mechanism, taken along the line IV—IV of Figure 3;

Figure 5 is a partial side elevation, looking in the direction indicated by the arrow V in Figure 4;

Figure 6 is a partial end elevation of the motor for driving the dispenser of Figure 1;

Figure 7 is an exploded view of a coin dispenser in accordance with another embodiment of the invention;

Figure 8 is a plan view of the dispenser of Figure 4 with one component removed; and

Figure 9 is a cross-section through one component of the dispenser of Figure 7.

Referring first to Figure 1, the dispenser mechanism proper, indicated at D, is driven by an electric motor M by way of a reduction gear box G. The motor and gear box are of known kind and will not be further described, though an addition to the motor is described below with reference to Figure 2.

The dispenser mechanism is formed by a generally tubular coin container or hopper 1, of which the portion 2 adjacent to the mouth 3 may be bevelled as shown or otherwise formed for convenient connection to an upward extension (not shown). Hopper 1 extends in an upward direction from a base member 4 provided with upwardly extending projections 5 which locate the hopper and which include notches into which outwardly projecting lugs 6 formed on hopper 1 engage to secure the hopper to the base. Obviously, other means for securing the hopper to the base may be provided if preferred, but the arrangement illustrated and described permits rapid separation of the hopper from the base when required.

The lower rim of the hopper is partly cut away (Figure 3) to form a slot 7 allowing

coins to leave the hopper. The extent of this slot is indicated by a double arrow 7 in Figure 3.

5 Within hopper 1 and immediately above base member 4 is rotatably mounted a coin transport member in the form of an aperture disc 9. The diameter of this disc is advantageously somewhat larger than the general internal diameter of the hopper 1, the inner surface of which is formed to provide a peripheral recess 8 at its lower end within which the edge of disc 9 may move. Disc 9 is provided with a convenient plurality (four in the illustrated embodiment) of apertures 10 each of a size to freely admit a coin (or token) of the size to be dispensed, while preventing the entrapment of the edge of any other coin between a coin lying in the aperture and the edge of the aperture. The apertures 10 are each provided with an outwardly bevelled edge 10a to assist the entry of coins into the apertures and to prevent jamming. Beneath the bevelled edge 10a, each aperture 10 has a parallel-sided portion 10b. Beneath portion 10b, the disc 9 is cut away to form a four-armed spider 9a, the arms of which do not extend radially outwardly substantially beyond the radial distance of the centres of apertures 10 from the centre of disc 9. One such arm is shown in plan in Figure 3.

The space *d* between the rim of disc 9 and the surface of base 4 is made sufficient freely to allow the passage of a coin of the size to be dispensed, but to prevent any possibility of two thinned coins from becoming wedged in the space.

Beneath base 4 and secured to it is a mounting plate 11 which supports a micro-switch 12 and a coin chute 13, the functions of which will now be described.

As disc 9 rotates in an anti-clockwise direction (as viewed from above) coins in the hopper will fall into some at least of the apertures. As they pass upwardly along the base 4, upon which they rest, they encounter the edge of a sector-shaped ejector blade 14 which is pivotally mounted upon base 4 at 15. Blade 14, conveniently of nylon, is provided with a downwardly extending flange 14a abutting the edge of base 4 and terminating below the level of the base in a lug 14b which serves to retain the arm 16 of a helical torsion spring 17 working on a pillar concentric with pivot 15 and having its other end 18 anchored against a convenient part of the structure. Normally, coins moved by disc 9 will encounter the ejector 14 and will emerge through slot 7 in the hopper side to encounter the actuator roller 19 of microswitch 12, which presents sufficient resistance to the coin to prevent its further movement until it is urged on into coin chute 13 by the pressure of a coin moving in a subsequent section of the disc 9. As the coin is thus ejected into

coin-chute 13 the actuated switch 12 will provide a coin-delivery denotive signal to any required form of control mechanism, such as a pre-set counter operating, when the predetermined number of coins has passed into the chute, to remove the supply from the driving motor.

If it should happen that a coin encountering ejector 14 is jammed in its slot, for example, by reason of the presence of an undersized coin or token in the hopper, then the ejector will move outwardly against the bias applied to it by spring 17. It will usually occur that such a jammed coin will be freed either by the resilient pressure applied to it by ejector 14 as it passes the position of the ejector, or by gravitational forces during the repeated circulation of the contents of the hopper. In any case, it will be understood that only coins actually passing into coin chute 13 are counted by the actuation of microswitch 12, so that one or more inoperative coin apertures in disc 9 merely delay but do not prevent the delivery into coin chute 13 of a required number of coins. It has been stated that the coin dispenser may be used in conjunction with an arrangement for stopping the movement of the disc 9 when a predetermined number of coins has passed down the chute 13. In order to arrange that the inertia of the armature of motor *M* shall not cause the delivery of any excess coins, the device shown in Figure 6 is advantageously provided on the motor. This device comprises a nylon stop member 21 secured on the motor shaft 22. Member 21 is provided with radially outward projections 23 which may be engaged by a stop 24 formed on a pivoted armature 25 rocking upon a pivot rod 26 held in a bracket 27 mounted upon the motor frame. Armature 25 has a projecting tail portion 28 extending adjacent but spaced from the yoke 29 of motor *M*. When the motor is energized, armature tail 28 will be attracted towards motor yoke 29 and stop portion 24 of the armature will be withdrawn from engagement with stop member 21, leaving the motor free to rotate. When the motor energization is withheld, armature 25 is rocked back to its initial position by a return spring 30 so that stop portion 24 engages one of projections 22 and arrests the motor.

The device shown in Figure 7—9 of the drawings comprises a generally tubular coin container or hopper 31, which in some applications may conveniently present a radially inwardly extending shoulder 32, spaced from the mouth 33 of the hopper, for engagement with an upward extension (not shown) of the hopper. Hopper 31 extends in an upward direction from a base member 34, having a raised rim 35 within which the lower end of the hopper is engaged. This rim is not essential to the construction

of the device, but is provided for convenience in assembling the component parts. Suitable fastening means are provided for securing hopper 31 to base member 34. Any suitable known fastening means may be used, but rapid release of the hopper from the base member is ensured by the arrangement shown, in which the lower rim of hopper 31 is provided with spaced, downwardly extending projections 36 having lateral slots 36a. Projections 36 enter similarly spaced slots 37 formed in base member 34, the hopper being guided during this operation by rim 35. The hopper is then rotated in an anti-clockwise direction as seen from above so that slots 36a engage on pins 38 extending radially of the device across slots 37, to hold the hopper in place on the base.

The rim of the hopper is cut away at 31a and the rim 35 of base member 34 is raised over a generally corresponding but somewhat shorter portion 35a to form between the opposed rims of hopper and base member a circumferentially extending slot through which coins may be ejected.

Within hopper 31 and immediately above base member 34 is rotatably mounted a coin transport member formed by an apertured disc assembly 39, the construction of which is more fully described with reference to Figures 8 and 9. Disc assembly 39 has in its upper surface a convenient plurality of circular apertures 40, of a size freely to admit a coin of the size to be dispensed, while preventing the entrapment of the edge of any other coin between the coin in the aperture and the edge of the aperture. The apertures are each provided with an outwardly bevelled edge 40a to assist in the entry of coins into the apertures and to avoid jamming. The apertures 40 are positioned close to the edge of the disc assembly, so that the bevelled edge of each is partly cut away, as at 40b (Figures 8 and 9).

As shown in Figure 9, disc assembly 39 is formed of three initially separate members, an upper, apertured disc 45 pierced by bevelled apertures 40 and conveniently having a domed central boss 45a from which extend downwardly two bosses 45b, provided with downwardly open blind, tapped holes. Bosses 45b pass into holes in a four-armed spacing member 46, formed with a diameter approximately such that if continuous its periphery would pass through the centres of apertures 40. Spacer 46 is cut away below apertures 40, so that circular indentations in its margin form downward extensions of the edges of apertures 40 on the radially inner sides thereof. The thickness of spacer 46 slightly exceeds that of the coins to be dispensed. A third component of disc assembly 39 is a bottom plate 47 pierced by holes aligned with the tapped holes in bosses 45b, into which pass screws 48 which secure the

major components of the assembly together. Spacer 46 is advantageously formed of hard steel and is provided with a square central aperture 46a into which fits the squared shaft 51 of an electric motor 50 (shown in part only), or other convenient driving means. Bottom plate 47 may initially be provided with a central hole which is circular and is of slightly less diameter than the diagonal size of squared shaft 51, permitting a force fit of the assembly on to the shaft.

If preferred, the three components of the coin transport member may be formed as a unitary body.

When hopper 31 contains coins of the size to be dispensed and disc assembly 39 is rotated anticlockwise by motor 50, then coins will fall into apertures 40 and lie upon the upper surface of bottom plate 47. As the aperture into which a coin 55 has dropped reaches the lowermost position shown in Figure 8, the coin will be engaged by ejector spring 42 and will be ejected through the slot formed between portion 31a of hopper 31 and portion 35a of base member 34.

An advancing coin of which the trailing edge has for any reason not fallen below the aperture in disc 45 will urge the spring 42 out of its path, thus preventing jamming of the mechanism.

It will often be convenient to provide a means of counting coins ejected by the dispenser. A resiliently biased member actuated by the coin leaving the disc assembly may be provided to actuate a suitable counter mechanism in known manner. One such arrangement is illustrated in the drawings. A microswitch 60 having an actuating lever 60a carrying a roller 60b is positioned on a platform 61, conveniently formed integrally with base member 34, so that the switch is actuated when a coin is ejected by the dispenser.

A mounting bracket 62, again conveniently integral with the dispenser, may be provided to assist in fastening the device to a support. In some applications it may be preferred to mount the device so that the axis about which disc assembly 39 rotates is inclined at between 30° and 45° to the vertical, but this is not essential to the operation of the apparatus.

It will be understood that the transport member described in relation to Figures 1—6 could be used in conjunction with an ejector member as described in relation to Figures 7—9, or that an ejector member as described in connection with Figures 1—6 could be used in cooperation with a coin transport member as described in connection with Figures 7—9. Likewise the feature that the lower end of the hopper is recessed to receive the outer margin of the transport member and the feature that the motor is provided with arresting means may be employed in the embodiment of Figures 7—9.

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WHAT WE CLAIM IS:—

1. A coin dispenser comprising a coin container of circular section having extending thereacross at its lower end a circular coin transport member mounted for rotation concentrically with said container and of which the upper most portion is pierced by circular apertures of a size to accept coins to be dispensed, another portion of said member beneath said uppermost portion forming individual radial arms extending between each adjacent pair of said apertures, said arms having a radial length such that their outer ends do not extend beyond a circle upon which lie the centres of said apertures, whereby coins passing through said apertures to be supported by a substrate are entrained by said arms, and an ejector member pivotally mounted with respect to said container and positioned to engage coins entrained by said arms thereby to cause said coins to pass through an aperture formed in the side of the container, said ejector member being movable against a resilient bias to a position permitting the passage past the ejector member position of any coin trapped in an aperture of said transport member.
2. A coin dispenser in accordance with claim 1 wherein said coin transport member includes a substrate portion, forming a disc of the same diameter as said uppermost portion, disposed beneath said other portions.
3. A coin dispenser in accordance with claim 1 or claim 2 wherein said coin transport member is a unitary body.
4. A coin dispenser in accordance with any

one of claims 1—3 wherein the lower margin of said coin container is provided with spaced projections engaging by partial rotation of said container with projections extending from said base member to secure the container to a base.

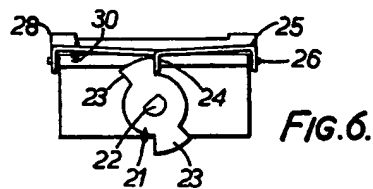
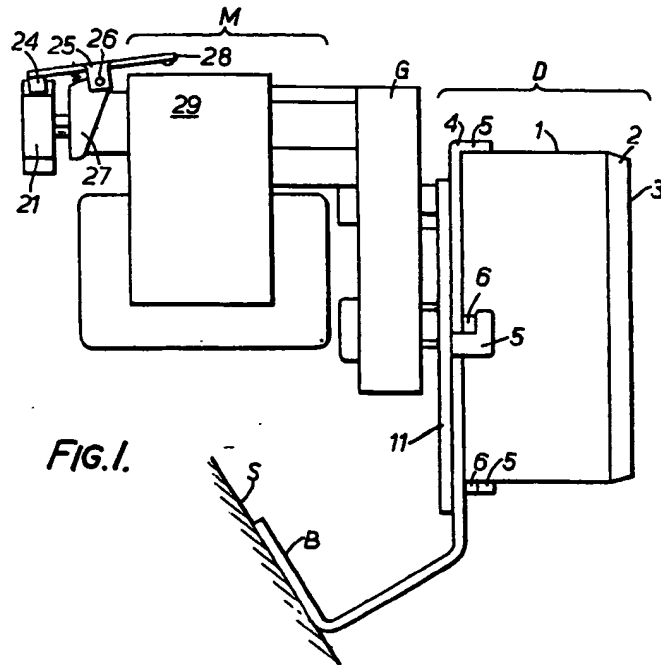
5. A coin dispenser in accordance with any one of claims 1—4 wherein a resiliently biased arm is so disposed with respect to the ejection slot in the container that each ejected coin moves said arm to actuate a coin-counting means.

6. A coin dispenser in accordance with claim 5 wherein said arm is positioned so as to arrest each partially ejected coin until the next ejected coin urges the formerly ejected coin past said arm.

7. A coin dispenser in accordance with any one of claims 1—6 wherein said coin transport member is driven through a reduction device by an electric motor having on the shaft thereof a stop member arranged for engagement with a stop formed on a pivoted armature so disposed that energization of the motor attracts one portion of the armature thereby to withdraw the stop portion from engagement with the stop member.

8. A coin dispenser substantially as described with reference to the accompanying drawings.

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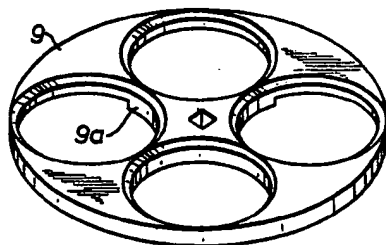
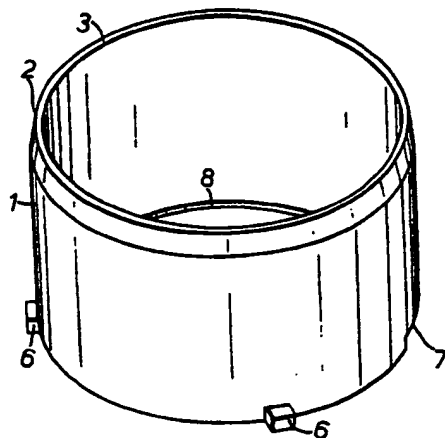
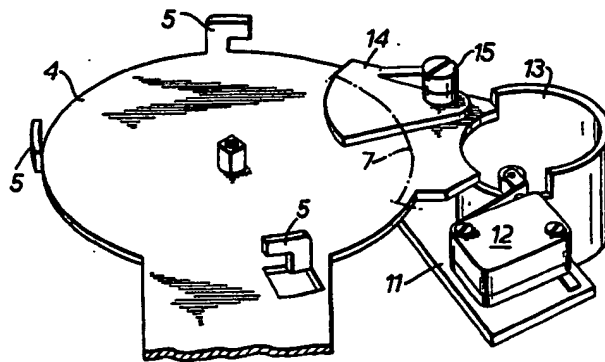


FIG. 2.



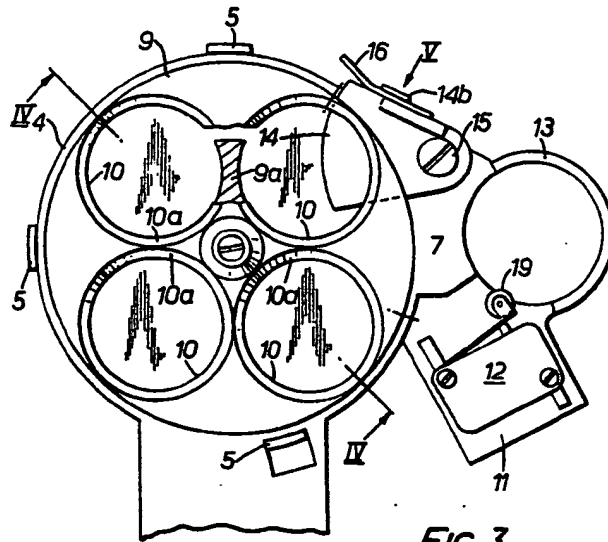


FIG. 3.

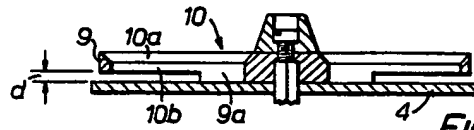


FIG. 4.

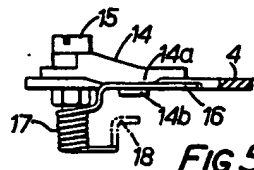


FIG. 5.

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COMPLETE SPECIFICATION

5 SHEETS

This drawing is a reproduction of
the Original on a reduced scale
Sheet 4

